Ch. 14 & 15 practice worksheet answers (book problems)

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13) there is overlap between the two events (owning car and owning an SUV).

16) The two events are not independent. Siblings being left-handed are dependent events

25) (a) P(I) = 0.3403

(b) P(E U No) = 0.0796

27) (a) P(P n P n P) = 0.1952

(b) $P(E^c \text{ n } E^c \text{ n } E^c) = 0.9131$

(c) Responses are independent

(d) As long as it is random polling, we can assume indep.

32) (a) 1- $P(AB) = 0.04$

2- $P(A \cup B) = 0.51$

3- $P(O^c) = 0.55$

(b) 1- $P(O \cap O \cap O \cap O) = 0.041$

2- $P(AB^c \cap AB^c \cap AB^c \cap AB^c) = 0.8493$

3- $1-P(A \cap A \cap A \cap A) = 0.9744$

4- $1-P(B^c \cap B^c \cap B^c \cap B^c) = 0.3726$

38) (a) $P(S \cap S \cap S^c \cap S^c \cap S^c) = 0.01382$

(b) $P(S^c \cap S^c \cap S^c \cap S) = 0.0921$

(c) $P(S \cap S \cap S \cap S \cap S) = 0.0000759$

(d) $1-P(S^c \cap S^c \cap S^c \cap S^c \cap S^c)= 0.5563$

41) $1-P(D^c \cap D^c \cap D^c \cap D^c) = 0.0776$

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8) (a) $P(M|C) = 6/18 = 0.3333$

(b) $P(C|F) = 12/28 = 0.4286$

(c) $P(F|D) = 16/24 = 0.6667$

11) (a) $P(PG \cap USA) = 84/7690 = 0.0109$

(b) $P(USA|PG) = 84/379 = 0.2216$

(c) $P(PG|USA) = 84/1557 = 0.0539$

(d) $P(Primary|China) = 506/1502 = 0.3369$

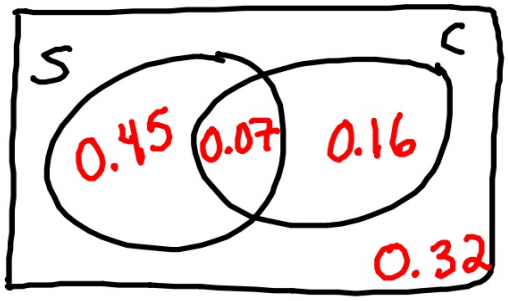
(e) $P(China|Primary) = 506/1161 = 0.4358$

13) $P(F) = 0.70$

$P(S|F) = 0.30$

$P(F \cap S) = P(S|F) * P(F) = 0.70 * 0.30 = \mathbf{0.21}$

19) P(S) = 0.52 P(C) = 0.23 P(S n C)= 0.07



(a) Eligibility = P(S U C) = P(S) + P(C) - P(S n C) = 0.68

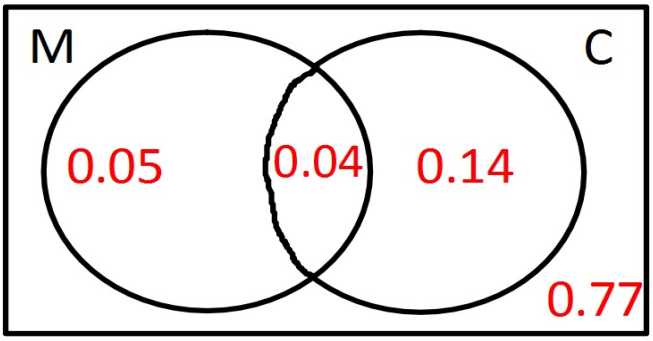
Ineligibility = $P(S^c \text{ n } C^c)$ = 1 - 0.68 = ***0.32***

(b) $P(C|S) = \frac{P(C \text{ n } S)}{P(S)} = \frac{0.07}{0.52} =$ 0.135

(c) No. P(C n S) ≠ 0

(d) No. P(C|S) ≠ P(C) or P(C n S) ≠ P(C)*P(S)

22) P(C) = 0.18 P(M) = 0.09 P(M n C) = 0.04



(a) $P(C|M) = \frac{P(C \cap M)}{P(M)} = \frac{0.04}{0.09} = 0.4444$

(b) No. $P(C \cap M) \neq 0$

(c) No. $P(C \cap M) \neq P(C)*P(M)$ or $P(C|M) \neq P(C)$

28) Independent: $P(B|A) = P(B)$ or $P(A \cap B) = P(A)*P(B)$

Check:

Does $P(R|F) = P(R)$? or Does $P(R \cap F) = P(R)*P(F)$

$\frac{0.26}{0.62} = 0.30$

$0.4194 \neq 0.30$

$0.26 = 0.30*0.62$

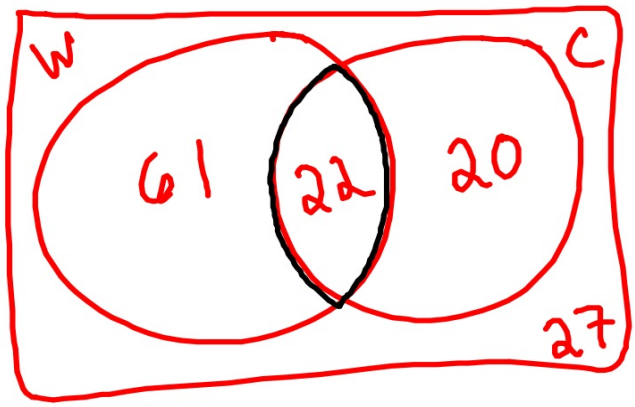
$0.26 \neq 0.186$

So, no, they are not independent.

Problem #2

1) $P(W) = 83/130$
2) $P(W^c) = 47/130$
3) $P(C) = 42/130$
4) $P(C^c) = 88/130$
5) $P(W \cap C) = 22/130$
6) $P(W \cup C) = 103/130$
7) $P(W^c \cap C^c) = 27/130$
8) $P(W^c \cup C^c) = 108/130$

$P(W \cap C)^c$



Problem #4:

1) (a) $P(W \cup R) = 0.70$ $= P(W) + P(R) - P(W \cap R)$

(b) $P(R|W) = 0.298$

(c) No. $P(W \cap R) \neq 0$.

(d) No. $P(R|W) \neq P(R)$

Probably $P(R|W) \approx P(R)$

2) $P(M \cup J) = 0.73$

3) $P(O \cap H) = 0.1403$

4) (a) $P(F \text{ and } Z) = P(F \cap Z) = 0.0902$

(b) $P(F \text{ or } Z) = P(F \cup Z) = 0.5098$ $P(F) + P(Z) - P(F \cap Z)$